Biological Pest Control in Colorado

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Who are we?





Palisade Insectary

- Began in the 1940's to fight Oriental fruit moth, a project that helped peach farmers and is still going
- Moved to new 14,000 sq. ft. facility in 1992
- Distributes over 20 biocontrol agents for the control of insect pests and weeds
- Is a **partner** in pest management



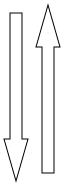




Overseas scientists discover and test new agents

The Role of the Palisade Insectary in biological control

Send promising agents to US



Select target weeds, develop biocontrol strategies, initiate overseas explorations for new agents

USDA ARS

USDA APHIS

Universities

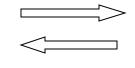
Suggest new target weeds, more agents for existing targets



Provide agents to be used in production and implementation

Public outreach
Provide biocontrol agents
Release biocontrol agents
Monitor control efforts
Develop implementation methods

Colorado Dept. Agriculture Insectary



Request agents
Suggest target weeds
Provide information for record keeping

BLM, NPS, USDA. BOR
State and local extension
Conservation Districts
Landowners
Resource managers
General public

Goals of our Strategic Plan

- 1. Rearing, collecting and distributing agents for use in pest management
- 2. Monitoring agent establishment and impact
- 3. Education of biocontrol end users and the general public on the use of biocontrol and the value of biocontrol as a pest control strategy



Palisade Insectary



Greenhouse for growing weeds

Rearing, collection and distribution of agents

- 1. Agents are reared at the Insectary until field insectaries can be established
- 2. Agents are collected from the field where possible
- 3. Agents are distributed to end users by Insectary staff or through the request-a-bug program



Preparing potatoes for use in rearing *Macrocentrus*



Collecting tamarisk beetles in the field





Preparing to ship bindweed mites

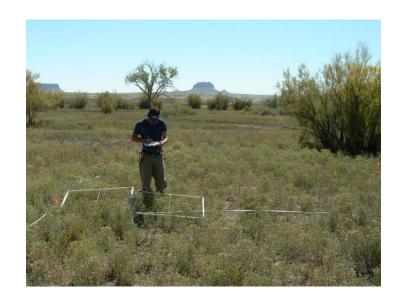
Monitoring

- Agent establishment and spread
- 2. Impact on target
- 3. Non target impacts, such as recovery of native vegetation





Tamarisk decline on the Dolores River



Monitoring Russian knapweed density, Ute Mtn. Ute Reservation



Education

Insectary staff instruct biocontrol end users on the proper use of agents and the expected results. We also give about 40 tours and presentations annually at the Insectary and around Colorado to educate pest managers, resource managers and the general public on the use and value of biocontrol.



Sonya Ortega leads leafy spurge biocontrol demonstration near Meeker, CO



Colleen Jandreau discusses cereal leaf beetle biocontrol during a USDA tour of the Insectary

What weeds can we control using biological agents?





Providing biocontrol agents/ developing biocontrol programs (numbers are for 2014 except for Canada thistle)

Leafy Spurge	<i>Aphthona</i> spp	200,000
	Oberea erythrocephala	1000
Field Bindweed	Aceria malherbae	900,000 (est)
	Tyta luctuosa	27,410
Dalmatian toadflax	Mecinus janthiniformis	11,115
	Calophasia lunula	6806
Yellow toadflax	Rhinusa linariae	300
	Mecinus janthinus	800
Knapweeds	Larinus minutus	4600
Russian knapweed	Jaapiella ivannikovi	1,788 galls
Musk thistle	Trichosirocalus horridus	3400
Canada thistle	Puccinia punctiformis	120 sites inoculated
Puncturevine	Microlarinus spp	4300
Tamarisk	Diorhabda carinulata	300,000





field bindweed



Bindweed mites are microscopic and cause the leaves to curl into galls





Tamarisk biological control





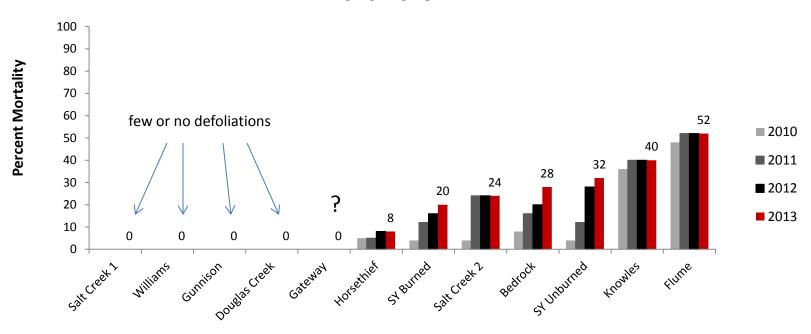


Bedrock 2007 (prior to beetles)



Bedrock 2010

Tamarisk Mortality in Western Colorado 2010-2013



Mecinus janthinus a stem boring weevil on yellow toadflax



- this species was collected on both yellow and Dalmatian toadflax in Europe. The Dalmatian toadflax weevil was later found to be a separate species, now named *Mecinus janthiniformis*.
- we now have four established sites where we can collect for future distributions







Colleen Jandreau puts up yellow toadflax tent

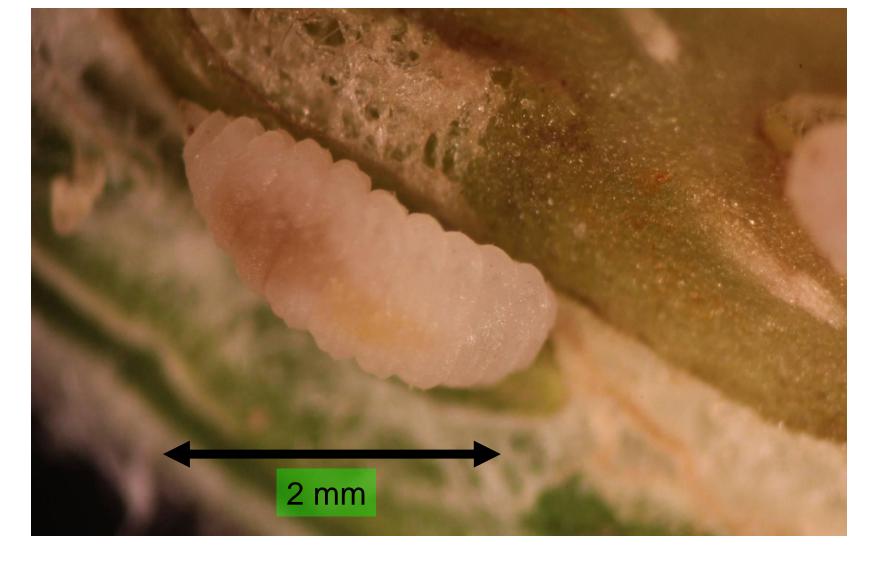
Mecinus hits yellow toadflax in Colorado

Russian knapweed biological control









A gall may contain up to 30 larvae of the gall fly. They are small but very effective in stopping shoot growth.











Canada thistle biocontrol using a rust fungus





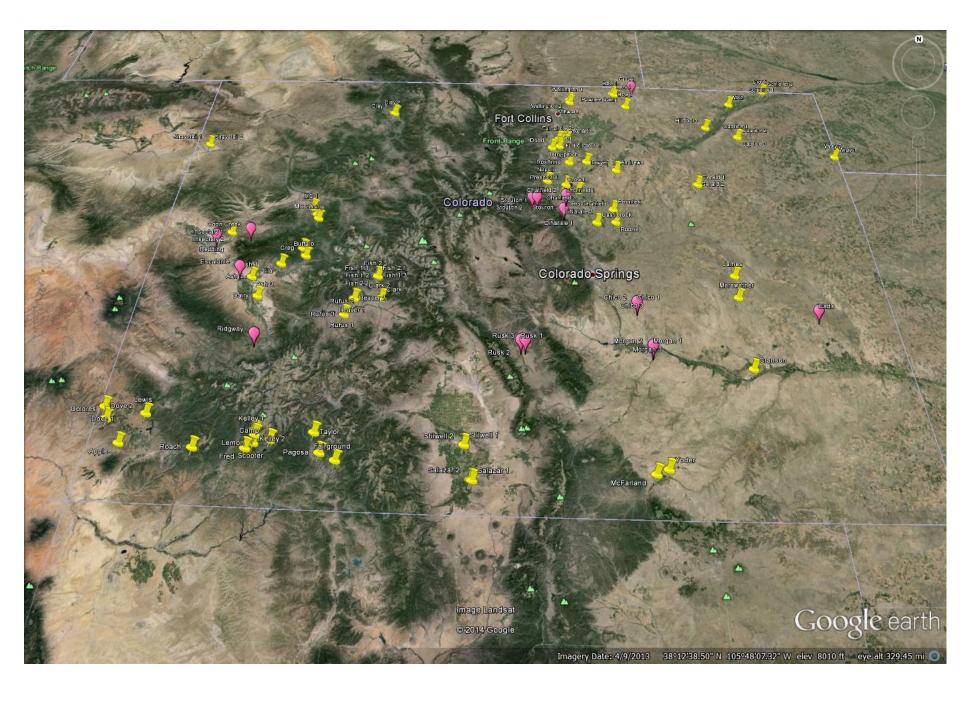




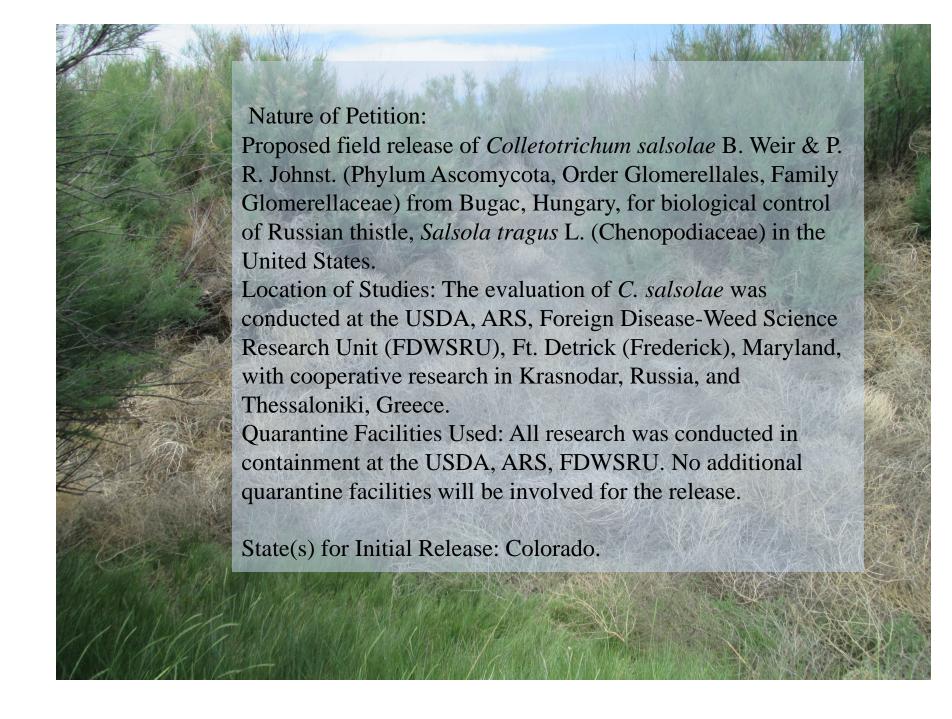
CT rust releases include monitoring transects at the release sites

We now have 80 release and monitoring points













Emerald ash borer



Japanese beetle



The Insectary is ready to initiate new projects as needed



